MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2022/2023

DPD 5211 – PROGRAM DESIGN

(For DIT students only)

7th OCTOBER 2023
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This examination paper consists of 4 pages.
2. **SECTION A:** There are **2** structured questions.
3. **SECTION B:** There is **1** structured question.

SECTION A: Structured Questions (Total: 20 Marks)

Instruction: Write all your answers in the Answer Booklet provided.

QUESTION 1 (10 marks)

a) Draw a flowchart that does the following:
- Get user input on how many numbers the user will enter.
- Using a *while* loop that repeats based on the first input:
  - Get user input for a number
  - Add up the total of the numbers entered so far.
- Once the loop terminates, display the total of all the numbers.

[5 marks]

b) Write a complete C program based on the descriptions below. Use built in functions from *math.h* header file.

Prompt user to enter the side of a hexagon, calculate its area and display the area. The formula for computing the area of a hexagon is

$$Area = \frac{3\sqrt{3}}{2} s^2$$

where s is the length of a side.

[5 marks]

SAMPLE OUTPUT

```
Enter the side of hexagon: 5.5

The area of the hexagon is 78.59
```

QUESTION 2 (10 marks)

a) Given the following declarations, find the value of *M* for the following expressions. You are required to show the step by step workings. [2 marks]

[Note: The expressions are NOT related to each other]

Declaration : int p = 5, q = 2, r = 11, s = 3, M;

i. M = ++p % q + r;

ii. M = --s / q + (p * r--);

Continued...

b) There are 3 errors in the program below. Write the line and the correct syntax.

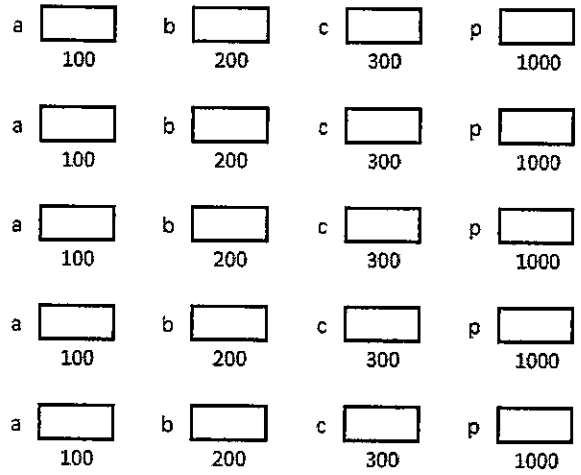
```
#include<stdio.h>                          //Line 1
int x;                                     //Line 2
void math2 (int *x)                        //Line 3
{ &x = &x + 11 + fun2(); }                 //Line 4
int fun2()                                 //Line 5
{int x=3;                                  //Line 6
 Return ++x;                               //Line 7
}                                          //Line 8
                                           //Line 9
void main()                                //Line 10
{ x = 1;                                   //Line 11
 printf("%d",x);                           //Line 12
 math2(&x);                                //Line 13
 printf("\nx=%f",x);                       //Line 14
}
```

[3 marks]

c) Trace the program execution given the following codes. Redraw the boxes shown below in your answer booklet and show step by step how the values changes with each code execution. [5 marks]

```
int a = 10, b = 2, c = 8, *p;

p = &b;
c = ++b * *p;
--*p;
p = &a;
*p = b + a;
```



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SECTION B: FULL PROGRAM (20 Marks)

Instruction: Write all your answers in the Answer Booklet provided.

You are required to write a **complete program** that determines the total bonus payout for 5 salespersons of JQ management corp. Write the full program based on the following instructions.

- Declare a *structure* called *Salesperson* that has *id (string)*, *status (string)*, *total_sales(float)* and *bonus(float)*
  - Global array *sp*, array size 5.

- In *main()* function:
  - Declare necessary variables.
  - Open the file *JQ.txt* for reading. If the file does not exist, display "*Error in opening the file*".
  - Using a *while loop*:
    - read the data from the file using global array *sp*.

Content of file JQ.txt *<id><total sales>*
S100891 35000 S102431 12000 S102511 40000 S110221 23000 S103330 8000

Figure 1 : JQ.txt

    - Set the bonus for every salesperson. Refer to Table 1.

Total Sales	**Bonus**
30,000 or more	2000
20,000 to less than 30,000	1000
10,000 to less than 20,000	500
Below 10,000	0

Table 1: Bonus Plan

    - Call function *getStatus(....)* passing the array element *sp* by reference.
    - Display the id, status and bonus.
    - Keep track of salespersons' status through counters.
    - Accumulate the bonus into total bonus.

  - Call function *summary(...)*, passing the counter variables and total bonus.
  - Close *JQ.txt* that was opened for reading..

- In *getStatus(...)* function:
  - Parameter: pointer *s* of structure *Salesperson.*
  - Set the status of a salesperson based on Table 2.

Continued...

Bonus	Status
2000	Excellent
1000	Good
500	Average
0	Poor

Table 2: Bonus and Status

- In *summary(...)* function:
  - Parameters: a (*int*), b(*int*), c(*int*), d(*int*), total(*float*)
  - Display the output. Refer to label 'X' at sample output.

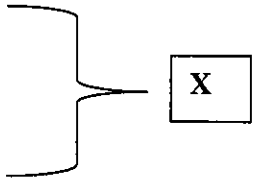
SAMPLE OUTPUT

```
----Welcome to JQ Quarterly Bonus Payout Report-------

S100891        Excellent RM 2000.00
S102431          Average RM  500.00
S102511        Excellent RM 2000.00
S110221             Good RM 1000.00
S103330             Poor RM    0.00

*Excellent* = 2
*Good* = 1
*Average* = 1
*Poor* = 1

Bonus Payout RM 5500.00
```



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